

Name: _____
A2CC: Quadratic Formula

Date: _____

Quadratic equations have just one unknown, but contain a square term as well as linear terms.

For example, $2x^2 + x = 3$ is a quadratic equation in x

$7t = 5t^2 + 1$ is a quadratic equation in t .

There is a formula for finding the unknown value, but before it can be used the equation must be written with all of its terms at one side of the equation i.e. in the form $ax^2 + bx + c = 0$ where a , b and c are known positive or negative numbers and x is the unknown value.

The Quadratic Formula

The solutions of the equation $ax^2 + bx + c = 0$ are:

$x =$

This formula gives two possible values for x . Usually in practical situations it will be obvious which answer is the correct one, but in some contexts both answers give possible solutions.

Example 1 Solve the equation $2x^2 + x = 3$

How to do it...

Rearrange the equation so all terms are at one side:

Write down the values of a , b and c :

Substitute these values into the formula:

Work out the values in the square root and denominator first:

Take the square root :

Split the formula into two, using $+$ in one and $-$ in the other:

Work out the answers:

Practice:

Solve these using the Quadratic Formula. Answers should be left in simplest radical form.

1 $x^2 + 2x = 8$

2 $3 + 7x + 2x^2 = 0$

3 $22t = t^2 + 21$

4 $t^2 - 7 = 6t$

5 $5x^2 = 2 - 9x$

6 $6p^2 + 5 = 17p$

7 $y^2 - 2y = 4$

8 $2r^2 + 6r = 3$

Solve these using the Quadratic Formula. Answers should be rounded to the nearest hundredth.

9 $3q = 2q^2 - 7$

10. $20 = 3r^2 + 5r$

11 $5 - 2x = x^2$

12 $3t^2 = 14t - 5$